A'
Conc'd.

C1

For the case of a silicon wafer for heating to a peak temperature above 1200 degrees C, representative values for the variables in (16) are: $\rho = 2.33 \times 10^3$ Kg/m^3; c_p = 700 J/(kg degrees C); $\Delta h = .75 \times 10^{-3}$m and k = 40 W/(m degrees C) which give:

In the Claims

Please substitute claims 1, 2, 3, 5, 7, 10, 18, 19, 20 and 21 with the following claims 1, 2, 3, 5, 7, 10, 18, 19, 20 and 21.

Clean Version of Each Replacement Claim

A2

C2

1. (Amended) A method for rapid thermal processing (RTP) of a substrate used to make semiconductor devices comprising the steps of:

forming a hot gas stream whose temperature is substantially above a peak substrate surface temperature obtained during thermal processing of the substrate by the hot gas stream; and

moving a substrate through the hot gas stream at a speed selected to treat an area of the surface of the substrate at a high peak temperature while establishing a temperature differential throughout the thickness of the substrate to enable the substrate to produce enhanced cooling of a treated area of the substrate by thermal conduction into the bulk of the substrate after the treated area has passed out of the hot gas stream.

2. (Amended) The method as claimed in claim 1 wherein the power density of the hot gas stream is above about 5×10^7 W/m^2.

A2 Concl'd C2

3. (Amended) The method as claimed in claim 1 wherein the exposure time t_E of said treated area of the substrate to the hot gas stream is less than a value given by the expression: $t_E < \sim 0.4\rho\ c_p \Delta h^2 / k$.

A3 C2

5. (Amended) The method as claimed in claim 1 for a silicon substrate wherein the velocity of the substrate is selected sufficiently high to yield an exposure time of any treated area on the substrate to the hot gas stream of less than about 8ms.

A4 C2

7. (Amended) The method as claimed in claim wherein said substrate is held in a substrate holder of the non-contact vortex type and wherein said substrate holder has an extension beyond the substrate edge, said extension extending out from the substrate for a distance greater than the characteristic width of the hot gas stream treatment area.

A5 C2

10. (Amended) The method as claimed in claim 1 and further including the step of diffusing doping atoms from the hot gas stream wherein a material containing the doping atoms was injected into the hot gas stream.

A6 C2

18. (Amended) The method of claim 1 wherein said movement of the substrate is controlled to provide multiple overlapping passes with sufficient intervals between adjacent passes to enable a portion of the substrate exposed to the hot gas stream during a previous pass to cool to a desired level for a generally uniform thermal treatment of the entire substrate while establishing said temperature differential.

19. (Amended) The method as claimed in claim 1 wherein said substrate has a motion configuration wherein the substrate moves through the hot gas stream with a step and scan motion such that the substrate moves with sequential, off-set passes through the hot gas stream with a controlled velocity along linear paths.

A6 Concl'd

20. (Amended) The method as claimed in claim 1 wherein said substrate has a motion configuration wherein the substrate moves through the hot gas stream with a step and scan motion such that the substrate moves with sequential, off-set passes through the hot gas stream with a controlled velocity along paths that are arcuate.

C2

21. (Amended) The method as claimed in claim 13 wherein the motion of the substrate is along overlapping scans while providing a cool-down time between scans with scans which are off-set from each other where:

scans in each set are greater in dimension than the characteristic width of the hot gas treatment area;

subsequent sets of scans are offset by sufficiently small steps to give uniform treatment and

sets of scans are run to fully treat the entire substrate.